

EPIDEMIOLOGIC SURVEY OF BLADDER CANCER IN GREATER NEW ORLEANS

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ABSTRACT

Primary ancestry of the patients and controls in this study was not statistically different but the Jewish population had a significantly increased incidence of bladder cancer. Over-all, a significantly greater number of patients smoked filtered cigarettes, began drinking artificially sweetened beverages at an earlier age, drank artificially sweetened beverages for a greater number of years, consumed a greater number of glasses of artificially sweetened beverages weekly and related a history of urinary tract infections. A significantly increased incidence of bladder cancer was noted in individuals employed by certain types of companies, by certain job titles and by certain job material handled. Analysis of the data failed to show any significant difference in years of consumption of coffee, amount of various types of coffee or tea consumed, consumption of various nonalcoholic and alcoholic beverages, including source of drinking water, use of hair dye, incidence of diabetes mellitus, family history of urinary cancer and a history of pelvic irradiation or bladder stones.

Previous epidemiological surveys of bladder cancer in greater New Orleans were conducted in 1947 to 1948 and 1958 to 1964.^{1,2} In this study new data are compared to that of earlier investigations and any significant environmental factors associated with bladder cancer in the greater New Orleans area are discussed.

METHODS

From December 1977 to December 1978, 101 patients with newly diagnosed bladder cancer were identified in the greater New Orleans area. Of these 101 patients 82 were available for interview. The patients were between 21 and 85 years old, and were interviewed personally in their homes by a trained interviewer approximately 2 to 3 months after initial diagnosis and treatment. The words bladder cancer were never mentioned by the interviewer to prevent possible prejudicing of the data. The patients were told that this was an environmental health survey, and that they were selected because of their recent illness and hospitalization. The interview required approximately 2 hours to conduct. The questionnaire included detailed histories of occupations, residences, sources of drinking water, illnesses and use of artificial sweeteners, tobacco, coffee and hair dyes. Matched controls were supplied by the National Cancer Institute through random digit dialing for those individuals <65 years old and through random selection from the files of the Health Care Financing Administration (Medicare) for those >65 years old. For every patient with bladder cancer 2 controls were interviewed. Failure to interview 19 patients was owing to death, unwillingness of a patient or a physician to allow an interview, or a patient's severe physical or emotional illness.

RESULTS

Of 82 patients and 169 controls interviewed no significant difference between the 2 groups was noted in regard to age, height, weight and years of education. Stratification of these groups by race and sex also failed to show any significant differences. No significant difference was noted between the primary ancestry of the patients with bladder cancer and the

controls, although 2 times as many individuals of Italian ancestry and 6 times as many with Polish ancestry had bladder cancer than the controls. The marital status of the individual did not influence the incidence of bladder cancer. However, the religious background of the individual was important, with a statistically significant increased incidence of bladder cancer being noted in the Jewish population ($p < 0.05$).

Only the use of filtered cigarettes was significantly greater in patients with bladder cancer than controls ($p = 0.01$) (table 1). Omitting the nonsmokers from each group the actual number of filtered cigarettes smoked daily by patients with bladder cancer was less than the number smoked by the controls. This number was not statistically significant and, thus, the number of filtered cigarettes smoked by the patients with bladder cancer was essentially the same as the number smoked daily by the controls. Therefore, the only difference between the 2 groups was that the actual number of smokers was greater in those with bladder cancer than in the controls. There was no significant difference between the 2 groups in regard to the consumption of nonfiltered cigarettes per day, cigars per week, pipes per week, tobacco plugs per month or snuff cans per week. Stratification of these data by race and sex revealed no significant difference among the various groups in the consumption of these tobacco products except in the black men, in whom a significantly greater use of cigars by the controls was noted ($p = 0.03$). Years of usage of tobacco products between patients and the matched controls showed no significant difference except years of pipe smoking by the controls was greater ($p = 0.05$) than that of the patients. Years of tobacco consumption stratified by race and sex showed no significant difference except white female patients had smoked filtered cigarettes for a greater number of years ($p = 0.02$) than the matched controls.

The age at which patients first drank artificially sweetened beverages was significantly lower ($p = 0.003$) than that of the matched controls (table 2). The number of glasses per week and the number of years of artificially sweetened beverages consumed were significantly greater in patients than the matched controls ($p = 0.02$ and $p = 0.03$, respectively). However, the number of glasses of artificially sweetened beverage per week actually consumed by the patients who drank these products and the actual number of years of consumption of those who drank artificially sweetened beverages were not significantly different from those in the control group. Stratification of these data by race and sex revealed no significant difference except

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white female patients had a significantly greater number of years of usage of artificially sweetened beverages ($p = 0.04$) than the matched controls.

No significant difference was noted in the number of years of coffee usage and the usage of various types of coffee or tea by patients and controls (table 3). Stratification of these data by race and sex revealed no significant differences except white male patients had a significantly greater consumption of regular ground coffee per week ($p = 0.05$) than the matched controls, white female patients had a significantly greater consumption of decaffeinated ground coffee per week ($p = 0.02$) than the matched controls, and white female controls had a significantly greater consumption of regular ground coffee per week ($p = 0.03$) than the matched patients. When other beverages, such as soft drinks, fruit juice, chocolate milk, Postum, water and alcoholic beverages, were compared between patients and controls there was no significant difference in the consumption of these products. The source of drinking water as a possible factor in the development of bladder cancer was analyzed but no significant difference was noted between patients and controls.

Comparison of the number of years of usage of hair dye and the number of times per year that hair dye was used between patients and the matched controls revealed no significant difference. When these data were stratified by race and sex a significantly increased incidence appeared in the number of times that hair dye was used per year in the white female patients ($p = 0.05$) than the matched controls. The per cent of diabetics in the patients and controls, and the age at the time of diagnosis of diabetes mellitus were not significantly different. However, patients had a significantly greater incidence of bladder and kidney infection ($p = 0.02$ and $p = 0.01$, respectively) than controls. Although patients had a greater incidence of bladder stones, family history of urinary cancer and history of pelvic irradiation than the controls, the difference was not significant. When these data were stratified by race and sex a significantly increased incidence of bladder infections ($p = 0.03$) was noted in black male patients than the matched controls.

TABLE 1. *Tobacco habits*

	Pts. Over-All (actual)	Controls Over-All (actual)	
No. nonfilter cigarettes/day	17.8 (26.6)	13.3 (25.5)	
No. filter cigarettes/day	13.1 (25.0)	9.4 (29.1)	$p = 0.01$
No. cigars/wk.	3.3 (20.8)	4.0 (27.8)	
No. pipes/wk.	6.0 (27.2)	4.6 (36.5)	
No. tobacco plugs/mo.	0.3 (4.3)	0.2 (4.4)	
No. snuff cans/wk.	0.0 (0.0)	0.01 (0.9)	
Yrs. nonfilter cigarettes	13.2 (19.9)	12.3 (33.6)	
Yrs. filter cigarettes	8.2 (16.0)	4.7 (14.9)	
Yrs. cigars	3.0 (18.7)	2.3 (15.8)	
Yrs. pipes	1.7 (7.9)	2.2 (17.1)	$p = 0.05$
Yrs. chewed tobacco	0.8 (11.6)	0.8 (13.1)	
Yrs. snuff	0.0 (0.0)	0.1 (5.0)	

TABLE 2. *Artificial sweetened beverage*

	Pts. Over-All (actual)	Controls Over-All (actual)	P Value
Age began usage	XXX (53.0)	XXX (61.3)	0.003
Yrs. usage	2.5 (8.0)	1.1 (6.2)	0.02
Glasses/wk.	3.4 (10.9)	1.4 (7.4)	0.03

TABLE 3. *Type of beverage*

	Pts. Over-All (actual)	Controls Over-All (actual)	
Yrs. coffee	46.7 (49.7)	47.3 (51.3)	
Cups regular instant/wk.	3.0 (17.6)	2.5 (18.0)	
Cups regular ground/wk.	0.3 (21.7)	3.4 (15.0)	
Cups decaffeinated instant/wk.	2.3 (14.8)	1.7 (11.2)	
Cups decaffeinated ground/wk.	0.7 (12.2)	0.04 (7.0)	
Cups coffee and chicory/wk.	11.8 (21.4)	11.4 (21.4)	
Cups espresso/wk.	0.1 (5.5)	0.0 (0.0)	
Cups hot tea/wk.	2.1 (6.0)	2.5 (7.1)	
Glasses iced tea/wk.	4.3 (12.1)	2.7 (8.4)	

TABLE 4. *Employment*

	% Pts.	% Controls	P Value
<i>Type of company</i>			
Fisheries	1.2	0.0	<0.03
Manufacturing (bakery products)	1.9	0.4	<0.05
Water transportation	7.2	3.3	<0.01
Telephone communication	1.4	0.1	<0.03
Sale trade motor vehicles	1.7	0.3	<0.05
Shoe repair shop	1.0	0.0	<0.05
<i>Job title</i>			
Mechanical engineer	3.6	0.0	<0.005
Transport oilers and greasers	1.4	0.1	<0.03
Sailors and deck hands	2.2	0.5	<0.03
Construction laborers	4.1	1.6	<0.03
<i>Job material handled</i>			
Paint	5.3	2.7	<0.05
Paint thinners	6.0	1.3	<0.005
Coal tar	1.0	0.0	<0.05
Rubber	1.2	0.0	<0.03
Coal	4.1	0.1	<0.005
Soldering materials	2.2	0.5	<0.05
Petroleum	4.3	0.2	<0.005
Welding materials	3.8	0.3	<0.005
Metals	3.8	0.3	<0.005
Office supplies	3.1	0.0	<0.005
Machinery, tools, industrial equipment	2.9	0.0	<0.005

Analysis of occupations by type of company revealed a significantly increased incidence of bladder cancer in those individuals employed by fisheries, manufacturers of bakery products, water transportation, telephone communication, sell or trade of motor vehicles and shoe repair shops. Analysis of occupations by job title revealed a significantly increased incidence of bladder cancer in those individuals employed as mechanical engineers, transport oilers and greasers, sailors and deck hands, and construction laborers. Analysis of occupations by the job material handled revealed a significantly increased incidence of bladder cancer among those individuals who handled paint, paint thinners, coal tar, rubber, soldering materials, petroleum, welding material, metals, office supplies, machinery, tools and industrial equipment (table 4).

DISCUSSION

In 1968 Dunham and associates reported an epidemiological survey of bladder cancer in greater New Orleans for patients seen from 1958 to 1964.² At that time the age-adjusted incidence rates of bladder cancer per 100,000 population ranged from 14.3 to 25.2 per cent for white male patients, 7.5 to 15.9 per cent for black male patients, 5.5 to 10.2 per cent for white female patients and 5.5 to 8.7 per cent for black female patients, indicating considerable yearly variation. The incidence rate for bladder cancer for the 6-year period was 11.4 per cent, that is 19.0 and 11.2 per cent for white and black male patients, respectively, and 7.4 and 7.2 per cent for white and black female patients, respectively. The corresponding age-adjusted rate for 1947, as determined in the Second National Cancer Survey, was 21.2 per cent, that is 34.6 per cent for white male patients, 7.0 per cent for black male patients, 17.6 per cent for white female patients and 14.6 per cent for black female patients.¹ This rate was 2 to 3 times larger in New Orleans than in Birmingham, Atlanta or Dallas, and at least a third larger than in Chicago, Detroit, Philadelphia, Pittsburgh, Denver and San Francisco.

The Third National Cancer Survey was a sequela to the 2 earlier national surveys, commonly referred to as the 10 Cities Surveys of 1937 and 1947. However, because of the medicopolitical climate in New Orleans during the late 1960s a survey in this area by a Federal agency was not conducted. Information for the Third National Cancer Survey, excluding New Orleans, was collected during the 3-year period from 1969 to 1971 and published in 1975.¹ The age-adjusted incidence rate for bladder cancer for the 3-year period was 12.4 per cent, that is 20.4 per cent for white male patients, 5.5 per cent for black male patients, 6.8 per cent for white female patients and 3.1 per cent for black

female patients. Thus, the New Orleans rates for 1958 to 1964 were considerably lower than for 1947 and generally similar to those for the entire 10 cities studied in 1947 to 1948 in the Second National Cancer Survey and the 7 cities and 2 entire states in the Third National Cancer Survey in 1969 to 1971. The over-all age-adjusted incidence rate for bladder cancer in 1978 in the present survey was 19.4 per cent, that is 30.6 per cent for white male patients, 19.8 per cent for black male patients, 13.3 per cent for white female patients, and 5.5 per cent for black female patients. These incidence rates are similar to those of the Second National Cancer Survey in 1947 rather than the later New Orleans survey in 1958 to 1964. The greater New Orleans area appears in 1978 to have an over-all incidence rate approximately 1½ times the national rate as reported in the Third National Cancer Survey.

The comparatively high incidence rate for bladder cancer in the greater New Orleans area in the Second National Cancer Survey in 1947 and now again in this survey in 1978 does not appear to be secondary to excessively yearly variation. However, in 1947 New Orleans was the primary medical center for the state and many patients diagnosed in New Orleans as having bladder cancer did not reside in the metropolitan area. Therefore, accrual of the incidence data may have unfairly credited New Orleans with an excessive number of bladder cancer cases because of mistakenly recorded place of residence at the time of diagnosis. This fact would not explain the increased incidence in 1978, since place of residence is documented to be within the metropolitan area. Possibly, the assumed increased incidence is unreal in that the comparison is made with data nearly a decade apart (1978 versus 1969 to 1971). Perhaps if national incidence rates were known in 1978 the difference would not be as striking. However, there does appear to be an increasing local incidence of bladder cancer (1978 versus 1958 to 1964).

In the epidemiological survey of New Orleans by Dunham and associates there was no clear correlation of bladder cancer with an occupation or industry. However, upon stratification for white male patients, there was an increased incidence of bladder cancer seen in sailors and deckhands, tinsmiths and coppersmiths, machinists, civil engineers, plumbers, structural metal workers, barbers and carpenters. There was no significant correlation between bladder cancer and tobacco usage, all forms combined, except among white and black male patients. However, even this correlation did not exist when data were analyzed by type of tobacco or amounts used. Bladder cancer in that study was not associated with amounts of total daily fluid ingested, alcoholic or nonalcoholic beverages, dietary habits or preparations for hair and scalp. Over-all, there was no significant association of bladder cancer and coffee drinking. However, upon race-sex stratification the black female patients showed a significant association of bladder cancer with coffee drinking and with the amount of coffee consumed. None of these associations was seen among white patients, nor was there an association with types of coffee consumed by any of the 4

race-sex groups. Cystitis in all male patients and prostatic diseases in white male patients were more frequent in patients with cancer of the bladder than controls but not statistically significant. Wynder and Goldsmith reported a large national case-control study with similar and conflicting results.⁴

In the present survey the primary ancestry of the patients and the controls was not statistically different but the Jewish population had a significantly increased incidence of bladder cancer. Over-all, a significantly greater number of patients smoked filtered cigarettes, commenced consumption of artificial sweetened beverages at an earlier age, drank artificially sweetened beverages for a greater number of years, consumed a greater number of glasses of artificially sweetened beverages weekly and related a history of urinary tract infections. Furthermore, a significantly increased incidence of bladder cancer was noted in individuals employed by certain types of companies, by certain job titles and by certain job material handled. Analysis of the data failed to show any significant difference in years of consumption of coffee, amount of various types of coffee or tea consumed, consumption of various nonalcoholic and alcoholic beverages, including source of drinking water, years of usage or number of times per year of hair dye, incidence of diabetes mellitus, family history of urinary cancer and a history of pelvic irradiation or bladder stones.

Stratification of the data by race and sex revealed a greater number of filtered cigarettes smoked, artificially sweetened beverages and decaffeinated ground coffee consumed, and hair dye used by the white female patients than the matched controls. White male patients showed a significantly greater consumption of regular ground coffee and black male patients revealed an increased incidence of bladder infections. It is important to note that the significant difference between patients and controls in regard to number of filtered cigarettes smoked daily and the consumption of artificially sweetened beverage products was secondary to an increased number of subjects in the case groups that indulged rather than an actual increased consumption of the products per individual subject. This seems to imply that possibly these are weak carcinogens and appear to be carcinogenic not necessarily by level of consumption so much as by individual biological tolerance.

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